

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
12 May 2005 (12.05.2005)

PCT

(10) International Publication Number
WO 2005/043528 A2

(51) International Patent Classification⁷: G11B 19/12, 7/09

(21) International Application Number:

PCT/IB2004/003525

(22) International Filing Date: 27 October 2004 (27.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

03300194.2 3 November 2003 (03.11.2003) EP

(71) Applicant (for all designated States except US): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): STALLINGA, Sjoerd [NL/FR]; Société Civile SPID, 156 Boulevard Haussmann, F-75008 Paris (FR). TUKKER, Teunis Willem [NL/FR]; Société Civile SPID, 156 Boulevard Haussmann, F-75008 Paris (FR).

(74) Agent: CHAFFRAIX, Jean; Société Civile SPID, 156 Boulevard Haussmann, F-75008 Paris (FR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

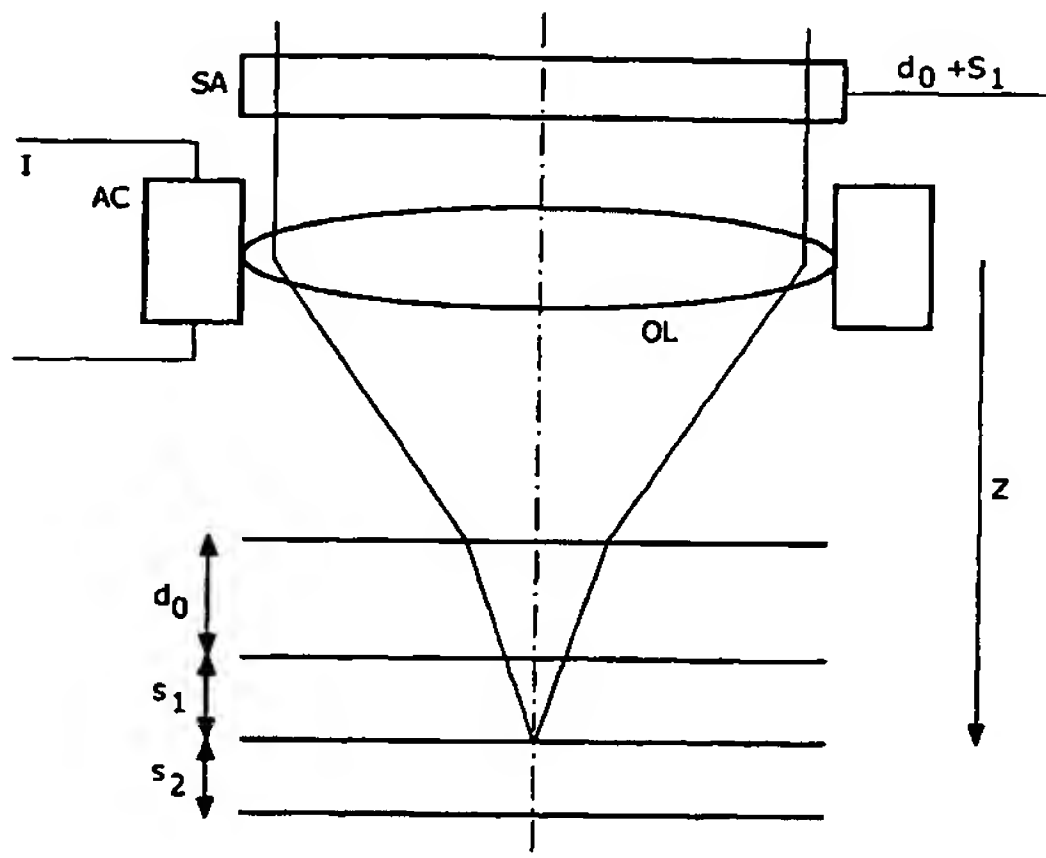
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE,

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR MEASURING THE DEPTH OF A DATA RECORD LAYER IN AN INFORMATION RECORD MEDIUM



(57) Abstract: Apparatus and method for measuring the depth of data record layers of an optical storage disc having a cover layer of thickness d , an entrance surface (S), and, for example, a first data layer (L0), a second data layer (L1) and a third data layer (L2). The optical apparatus comprises a spherical aberration compensator (SA), and an objective lens (OL) mounted in an actuator (AC), the actuator (AC) receiving a current I and being arranged and configured to move the objective lens (OL) in the z (axial) axis relative to the optical storage disc. Light incident on the objective lens (OL) is converged into a cone-like beam such that it is focussed on one of the data layers (D1). A control signal is used to keep the scanning spot focussed on the data layer (L1). This control signal is the focus error signal (FES) and is provided by the actuator drive (AC). In order to provide the spherical aberration compensator (SA) with right control signal, the depth of each data layer must be measured and means are provided for measuring the depth of the data layer(s) of a single- or multi-layer disc, and this achieved by using the distance between zero-crossings of the focus error signal (FES).



EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.